



## The Seal, the Logo and the Coat of Arms

or as some may say,  
Australia in Chains, the  
Nut and the  
Kangaroos!

### The End of an Era

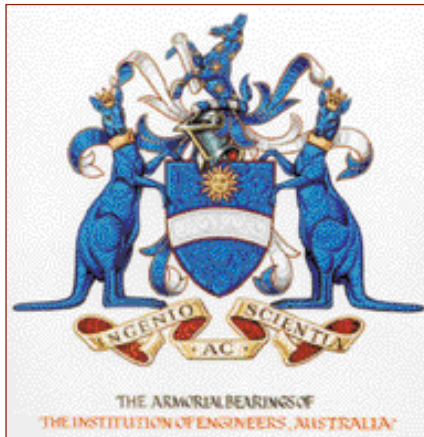
This is the first issue of Engineering Heritage Australia without the familiar "Australia in Chains" at its head. To mark the passing of this usage the history of the Institution's symbols makes interesting reading.

### The Seal

The Institution's Seal can trace its origins back to the formation of the Institution of Engineers, Australia in 1919. It was adopted in 1921 and the scroll added after the Royal Charter was granted in 1938.

Until 1988, the Seal doubled as the Institution's logo and appeared on publications, stationery and other items which now carry the hexagon logo.

The Seal was then reserved for official documentation of the Institution (mainly certificates).



*Azure a Fess enarched Argent in chief a Sun in splendour visaged Gold And for the Crest upon a Helm with a Wreath Argent and Azure A demi-Pantheon Azure semy of Estoiles Or holding between its forefeet a Scroll argent Mantled Azure doubled Argent as the same are in the margin hereof more clearly depicted to be borne and used by the Institution of Engineers, Australia on its Common Seal or otherwise according to the Laws of Arms And by the authority aforesaid I the said Garter do by these Presents further grant and assign unto the Institution of Engineers, Australia, the Supporters following that is to say On either side a kangaroo sejant guardant Azure gorged Or and crowned with a Crown composed of Wattle Sprigs Gold the whole to be borne and used for ever hereafter by the said Institution of Engineers, Australia on its common Seal or otherwise and according to the Laws of Arms.*

### The Logo

The corporate logo of the Institution of Engineers, Australia comprises a red hexagon, divided by an arc joining the lower two side points, accompanied in black by the words "The Institution of Engineers, Australia" or "IEAust".

The hexagon represents, alternatively, the honeycomb structure used in construction, or cellular radio networks, the benzene ring of organic chemistry, or the shape of a bolthead. Similarly, the arc or arch relates to engineering as a basic element in building and as part of a sine wave.

This logo has been registered as the official trade mark of the Institution.

### Coat of Arms

In 1983, the Institution of Engineers, Australia was granted a Coat of Arms by the College of Arms in London.

Included in the Coat of Arms is a silver or white arc or arch on a shield, depicting the strength and dignity of structures and machines, surmounted by a golden sun representing the use and conservation of energy. Supporting the shield are two kangaroos.

These elements have been incorporated into a "stylised" version of the Coat of Arms, which provides a modern

### STOP PRESS!

On Wednesday, 23<sup>rd</sup> May 2001, the Council of the Institution of Engineers Australia unanimously approved the change of the National Committee on Engineering Heritage to the special interest group, Engineering Heritage Australia, reporting directly to the National Vice President Engineering Practice.

Further, the group was commended for the work they are performing throughout Australia.

All who have worked so hard over many years to further the cause of engineering heritage can give themselves a pat on the back. Special mention must also be made of the hard work of Michael Clarke, Chair of the NCEH and first chair (or president?) of Engineering Heritage Australia, in guiding the change.

- Editor

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Australian interpretation of the original design. While retaining the sun to represent energy it is presented as a sunrise above the pinnacle of the hexagon to symbolise the dawning of new ideas. The shield has been replaced by The Institution's hexagon motif (incorporating the arc) and the original motto "Ingenio ac scientia" by "The Institution of Engineers, Australia".

Thus, through the use of the hexagon, the Institution's logo and Coat of Arms reinforce each other and they are immediately seen to be symbols from the same organisation.

The arms description wording by the College of Heralds is shown with a photograph of the full Coat of Arms.

#### Break with Tradition – Coat of Arms Now on Plaques and Newsletter

When the coat of arms was granted, the National Committee on Engineering Heritage was given permission by the National President of the day to continue use of the Seal on heritage plaques, because of its historic association with The Institution and the plaquing program. The Seal was also used on the newsletter when its publication commenced. However, last year National President Martin Cole requested that the coat of arms replace the Seal on heritage plaques and so this commenced this year – 2001.

The coat of arms will thus be on all the Centenary of Federation plaques.

#### Another Change Heralded

At its meeting on 16 February 2001, Council agreed to adopt a new Institution Seal to incorporate the Institution's present Coat of Arms.

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## Heritage Engineering Excellence Awards, Sydney

In October 2000, the project for the construction of the two spires on St Mary's Cathedral, Sydney, (Reg.Nat.Est. 001897) was awarded the Colin Crisp Engineering Heritage Excellence Award of Sydney Division of the Institution. Funds for the construction of the Cathedral ran out at the end of the nineteenth century and it was not possible to add the spires on the two southern towers in accordance with architect William Wardell's design. After one hundred years of the familiar landmark of square-topped towers, the matter has now been remedied.

A particular feature of the work was the consideration given to seismic matters which resulted in substantial steel frames in the existing tower sections: a matter not likely to have been contemplated by nineteenth century designers. Neither would the use of a Russian helicopter to lift the steel frames of the stone-clad spires into position.

The spires project was entered by the NSW Department of Public Works and Services. Seismic structural aspects were the domain of Hughes Trueman and the principal contractor was Waller Constructions P/L.

An unusual entry that was awarded the highly commended status was the raising of a 900-tonne stone columnar cupola through a height of four metres. This was at the southern end of the building popularly known as Wales House (RNE 001841), located in the angle between Pitt and O'Connell Streets, where they meet Hunter Street. The building had been occupied by the then Bank of New South Wales from the



*The raised cupola on Wales House*

early 1960's after over four decades of use by its original owner John Fairfax. The cupola lift was part of the addition of two floors to the building in the process of its conversion to the new Radisson Plaza Hotel. (An interesting heritage aside is that the Bank and now the Hotel have preserved the old board room and editor-in-chief's room as they were when Fairfax left in 1956.)

The cupola project was entered by CCH Group P/L with the Walter Construction Group as contractors and Taylor Thomson Whitting as structural engineers.

The entry by the Australian Technology Park and the NSW Department of Public Works and Services covering the conversion of the former Eveleigh Locomotive Workshops (RNE 015903) into the Park main building was also the recipient of a "highly commended" award.

*Ian Bowie*

## A brief summary of the History of Richmond Main Colliery

*The showpiece of early 20<sup>th</sup> century Australian coal mining is still largely intact in the NSW Hunter Valley. Newcastle Division President Peter Cockbain has researched the history.*

The Richmond Main Colliery (originally Richmond Vale) was the “showpiece” mine of the J & A Brown Colliery group. The Brown brothers, John, William and Stephen, purchased the property for £39,500 in 1897 after two earlier attempts at establishing a mine had failed. These earlier attempts were by a Melbourne syndicate “Richmond Vale Coal Company” in 1887 and again in 1895.

As the mine site was somewhat isolated, being 12 miles south of Maitland NSW, all infrastructure had to be established including a railway, a dam across Wallis Creek, water pipelines and roads. Other works required were completion of shaft sinking and the establishment of the surface and underground buildings, winders etc., together with a power station of 100 kW capacity incorporating boilers, steam engine and alternator.

To finance the considerable cost of this shaft access colliery J&A Brown established the nearby Pelaw Main Colliery, which was a tunnel access mine directly into the outcrop of the Great Greta Seam at Kurri Kurri, with ultimate access to the established South Maitland Railway network. Establishment costs and time to production for Pelaw Main was considerably less than for the Richmond Main mine and provided the cash to allow Richmond Main to be established and finally come into production in 1914 with a production of 9,670 tons.

The colliery was established using the latest technology and layout from equivalent English collieries of the time.

The shaft winding system incorporated twin double decked cages each capable of holding 4 skips of 1.25 tons. The Ward Leonard winding equipment consisted of 660HP 2.2kV AC motor generator set, fitted with an Ilgner flywheel 20ft (6.1m) dia. and weighing 12 tons. The winding motor of 900 HP continuous rating with a peak load rating of 1850 HP could haul the fully laden cage the 756 ft (230m) from pit bottom to pit top in 42 seconds. The hoisting rope was 6 inch circumference, 2" dia. fitted with Reliance capels and Ormerod hooks.

The underground workings around the pit bottom were finished to a very high degree with the tunnels leading from the pit bottom to the workings being brick lined for a considerable distance. The pit bottom haulage rooms for the endless rope haulages were also brick lined and the whole area was maintained in a pristine condition to allow the Brown Brothers to bring clients and dignitaries to their showpiece mine.

Production peaked at 170,000 tons per year in 1918 and a further expansion was planned for another shaft, additional electric winder and surface facilities. This was abandoned in 1930 with the death of John Brown. The colliery introduced “more modern” mining equipment during its life and had a capacity of 3000 tons per eight hour shift in 1947.

Mining conditions underground deteriorated and although continuous miner, shuttle cars and conveyors were introduced in the 1960's the production remained static at 1200 tons per day until the mine's final closure on Friday 14th July 1967. An allocation of money from the Bicentenary Fund allowed refurbishment of the mine surface buildings in 1988, but they have deteriorated since that time; the site still supports the very active Richmond Vale Railway Museum and a commercial blacksmith's shop producing products for local markets.

A copy of the more detailed mine history can be obtained from P. Cockbain, Ampcontrol Pty Limited, PO Box 304 Warners Bay, corp@ampcontrol.com.au.

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## Narrows Bridge, Perth, WA

On Friday 19 November 1999, the Hon Richard Court MLA, Premier of Western Australia, unveiled the Institution's National Engineering Landmark Commemorative Plaque for the Narrows Bridge over the Swan River in Perth, Western Australia, forty years after its Official Opening in November 1959.

At the time of its concept, design and construction it was, by world standards, a leading engineering structure in the field of concrete bridge building.

It was designed by G. Maunsell & Partners and built by Christiani & Nielson and J. O. Clough & Son for the Main Roads Department, Western Australia.

The scene was set by the initial requirement for the structure to be of a very slim-line profile consisting of a five-span concrete arch bridge, 1,100 feet (335m) between abutments and with a central span of some 320 feet (97.3m).

To achieve this requirement, the bridge is supported upon long piles formed from 31.75 inch diameter steel tubes, driven by a drop hammer working internally. The piles were afterwards filled with reinforced concrete, and a special pile was developed to overcome a ground problem

which arose on the north shore. The deck consists of eight I-section beams precast in short lengths and stressed together by means of external

stranded cables developed especially for this project.

On a National Scale, there were three Australian engineering firsts: it was the first segmented bridge construction; it was the first bridge to use external pre-stressing cables to allow a lighter (thinner) web construction; and it was the first use of Gambia piles.

On an International Scale, there were two world firsts demonstrating the very successful “state of the art” achievements carried out: the design required a successful research program to solve the problem of defining the ultimate behaviour of pre-stressed concrete beams subject to combined bending and shear at the supports; and it was the first bridge in the world to require the development of special 19 strand 0.7 inch diameter high tensile wire cables



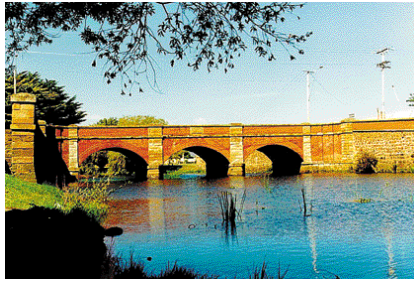
Narrows Bridge

*Continued on page 5*



## Tasmania's Heritage Bridges

Tasmania has a rich bridge heritage: the oldest surviving bridge (Richmond), 16 of the oldest 20 in Australia, the first composite steel-concrete bridge (Vincent's Rivulet) and two of the first three welded bridges in Australia.



*The Red Bridge at Campbell Town*

In his lecture on the "Management of Tasmania's Bridge Heritage" on 31 August, 2000 Rod McGee explained how heritage values of bridges are assessed against ten criteria and why conservation plans are necessary before significant remedial work is planned for heritage structures.

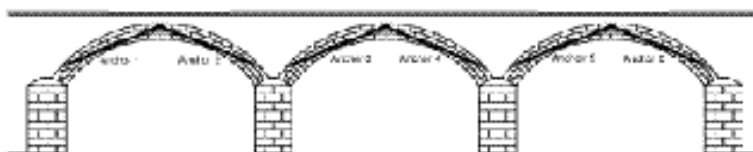
One can't help wondering how our old masonry bridges, built for bullock drays, can be subjected to much heavier vehicles on arterial highways and still do the job? The answer must be that arch structures, well-built with durable materials, have large reserves of strength, and that they have been well maintained.

One example is the Red Bridge on Highway 1 at Campbell Town. It is one of the oldest dozen surviving bridges in Australia. Built in 1836-1838, it has stone piers, red brick arches and substantial river training walls. In 2000 it was strengthened for the first time.

The method of strengthening is shown in the diagram below. "Cintec" system stainless steel anchors were grouted into angled holes accurately drilled from the road surface to intersect the arches tangentially at the arch quarter-points in a proprietary procedure known as "Archtec". The system was developed in Europe and the design for this bridge was prepared in the UK using an analysis technique known as discrete element analysis, which dynamically models the individual masonry elements and their interactions with neighbours. As the strengthening is hidden inside the arches, it has had no visual impact at all.

Other works on this bridge included repointing of the brickwork using a special mortar required to be more porous than the bricks, grouting of voids, renewal of the road pavement to reduce traffic vibration and impacts on the bridge structure and drainage enhancement to limit water flowing through the masonry.

*Bruce Cole*



*Strengthening anchor arrangement at Red Bridge*

## Hobart's New Floating Arch Bridge Nearly Floated Away

On 4th December 1943, when the floating arch bridge across the Derwent River was about to be opened to traffic, a southerly storm severely damaged the bridge to the extent that the insurers paid the owners about half the cost of the bridge.

The maximum wind velocity recorded at the Weather Bureau at about 9.50am that day was nearly 90 km/h. Gauges installed in the steel members, linking the concrete arch to the western abutment at the lift span, showed a range of 1,000 tons during the storm. This range was estimated to arise from 200 tons steady tension with a superimposed fluctuation of 500 tons, alternating between compression and tension, caused by oscillations of the floating arch.

The steel links were hinged at each end to accommodate the tidal range. Each hinge was attached to the bridge by ten bolts. Four bolts on the upstream western hinge fractured, as did one in the downstream hinge.



*The Hobart Floating Bridge*

During the storm some of the nuts worked loose and were frequently re-tightened. This action may have resulted in some bolts carrying loads greater than their design strength of about 110 tons each.

One of the bolts recovered during the storm

showed a very poor fracture; it was coarse-grained with no indication of ductility. Metallurgical analysis and physical testing of the material in the failed bolts showed that they were made of wrought iron, not mild steel.

Use of the wrong material is accounted for by the history of the contract for the supply of the steel for the bolts. The contractor had delivered about 75% of the order when supplies were restricted by war conditions. The bridge construction contractors then bought up all the 2 inch diameter material available in Hobart. The Resident Engineer rejected most of this material because it was wrought iron, but it appeared that one bar got through the screening and some bolts were cut from it.

Tensile tests showed failure of the wrought iron bolts at 22 tons compared with steel at 30 tons, and impact tests gave results of 2 foot pounds for wrought iron compared with 30 foot pounds for steel.

*Allen Wilson*

*(This note is an extract from a talk entitled "Hobart's Floating Bridge" which Allen Wilson gave to the Tasmania Division in November 2000.)*

## Abt Railway Locomotive Reconstruction

The original Abt railway, running between Queenstown and the port of Strahan on Macquarie Harbour in western Tasmania, was completed about 1896. Ever since the railway closed in 1963, there have been calls for it to be rebuilt, not for its original purpose to transport minerals, but to provide a unique Tasmanian heritage/tourism experience.

In 1998 the Commonwealth Government allocated more than \$20 million from the Centenary of Federation Fund to re-establish the railway. The Tasmanian Government also provided over \$2 million towards the construction task which involves 35 km of track including 40 bridges, the restoration of three locomotives and the building of 12 carriages. Two of the locomotives are Abt locomotives which operate on a rack-and-pinion system, invented in 1885 by a Swiss engineer, Dr Roman Abt.

The Abt system comprises a pair of toothed rails mounted midway between the conventional outside rails. These rack rails are engaged by two similarly toothed pinion wheels built into the locomotive. The pinions are driven by a separate pair of steam cylinders to those powering the driving wheels.

The two sections of Abt track were located on opposite sides of the ridge dividing the King River and Queen River valleys. A 2.4 km section of 1 in 16 grade track climbed up the Queen River side, while a 4.8 km section climbed up the King River side. A conventional railway normally has grades no steeper than between 1 in 30 and 1 in 40, but the use of rack rails allows trains to climb steeper grades. Both the driving wheels and the pinion wheels are powered in climbing mode.

Four of the five 25 tonne Abt locomotives were built by Dubs & Co of Scotland and entered service between 1896 and 1901. The fifth engine was manufactured in 1938 by the North British Locomotive Company which took over from Dubs. Fortunately four have been preserved and were on display at various locations over the last four decades.

Restoration of the first locomotive, shown in the picture, has recently been completed by the Tasmanian firm of Saunders & Ward Pty Ltd over a nine-month period. The work involved a complete stripdown, extensive crack testing, the manufacture of a new boiler (designed in Wales, UK), the replacement of the rack engine carriage, rack pinions, driving axles, water tanks and many other lesser items. All four steam cylinders were rebored and oversize pistons were manufactured including some spare components. Some of these tasks were sub-contracted to other Tasmanian engineering firms.

Saunders & Ward also constructed the chassis for 12 carriages, together with over 7 km of dual rack which was flame-cut from 20 mm plate.

The cost of restoring the first of the two locomotives exceeded \$500,000, and the relatively short period involved is a credit to the local firm. Restoration of the second locomotive is scheduled for completion in June 2001.

The main civil construction works are being carried out by the Tasmanian firm of Hazell Bros., overseen by the consulting firm Sinclair Knight Merz.



Abt Locomotive No. 3 restored.  
Photo courtesy "The Mercury"

Narrows Bridge, Perth, WA  
Continued from page 3

for the longitudinal pre-stressing cables.

Further details of the design and construction of the bridge can be obtained by reference to the Paper No.6498 entitled "The Narrows Bridge, Perth, Western Australia" given to the Institution of Civil Engineers, London by J.W. Baxter and E.M. Birkett of G. Maunsell & Partners and E.W.H. Gifford of E.W.H. Gifford and Partners on 17 October 1961.

The wording on the Plaque states:

NARROWS BRIDGE

*This graceful five-span bridge, designed by G Maunsell & Partners and built by Christiani & Nielsen and J O Clough & Son for the Main Roads Department, Western Australia, was the crucial element of the 1955 Stephenson-Hepburn Plan (later the Metropolitan Region Scheme) which reshaped the development of Perth.*

*It was the first concrete bridge in Australia to use Gambia Piles, segmental construction methods and external prestressing cables to allow lighter I-section deck beams.*

*At its opening in 1959, it was one of the largest segmental, prestressed concrete, continuous bridges in existence and its 97.5 metre central span the longest of its type in Australia.*

Bruce James

Fred Lakin

## Engineering Heritage Australia Committee

The final NCEH and first committee of Engineering Heritage Australia is made up of the following members:

- Michael Clarke, Sydney - Chairman
- Bruce Cole, Tasmania - Deputy chairman
- Harry Trueman, Sydney - Immediate past chairman
- Ian Arthur, Sydney
- Peter Gesling, Newcastle
- Bruce James, Western Australia
- John Jenkins, Northern
- Bill Jordan, Newcastle - supernumerary and newsletter editor

- Nigel Ridgway, South Australia
  - Bruce Sandie, Victoria
  - Keith Baker, Canberra
  - Robin Black, Queensland
- all ably assisted by committee administrator, Sue Mayrhofer in National Office.

The Committee also receives valuable help from nine "national" Corresponding Members from as far away as the U.K. and New Zealand with a further six "divisional" Corresponding Members.

## Eight Historic Plaques for Dams in Tasmania

A record was set in Tasmania on Saturday 24 March 2001 when eight plaques were awarded at a single ceremony. Hydro Tasmania owns all the dams, but their locations are widely separated. The site chosen for the ceremony was Sheffield in the northwest of the State, relatively close to Cethana and Devils Gate dams which were among those recognised on the day.

Prior to the formalities, about 70 guests boarded coaches for a trip to Cethana Dam where engineers described the original design and construction, and the plans for increasing the spillway capacity later this year.

Held in a senior citizens club, the ceremony was attended by the Governor of Tasmania, Sir Guy Green and 90 guests. The audience included the Chairman of the Australian National Committee on Large Dams, local mayors, past and present Hydro Tasmania employees and many Institution members.

National Engineering Landmark plaques were awarded to:

*Cethana Dam on the Forth River  
Gordon Dam on the Gordon River.*

Historic Engineering Markers were awarded to

*Miena No 2 Dam on the Great Lake  
Scotts Peak Dam on Lake Pedder  
Crotty Dam on the King River  
Devils Gate Dam on the Forth River  
Catagunya Dam on the Derwent River  
Laughing Jack Dam on Powers Rivulet.*

All these dams are included in the 26 dams Australia-wide which were nominated for listing on the Register of the National Estate in 1999 (see August 2000 Newsletter).

Formalities began with the Governor's arrival at 3pm.



*His Excellency Sir Guy Green on the left  
with Keith Drewitt*

Keith Drewitt, Chairman of the Tasmania Division Heritage Committee, introduced each of the speakers. Bruce Cole gave an illustrated address on the heritage significance of each dam. Deputy National President of the Institution Peter Greenwood spoke about the plaquing program and awarded the plaques. His Excellency the Governor spoke next and then unveiled the impressive array of plaques mounted on a display board. In accepting the plaques, the Hon. Peter Rae, Chairman of Hydro Tasmania, took the opportunity to present the Governor and Keith Drewitt with copies of *Lifeblood, Tasmania's Hydro Power*, the recently published history of the Hydro-Electric Commission.

A sumptuous afternoon tea, which country ladies everywhere seem to conjure up with consummate ease, followed the ceremony.

The Heritage Committee was thrilled with the good turn up at this somewhat distant location, and the attendees responses left no doubt that they found the occasion both interesting and very enjoyable. The day of sunshine in a wet period was a nice bonus.

*Keith Drewitt and Bruce Cole*

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## The NM25 Conservation Project

The Pichi Richi Railway Preservation Society is currently reconstructing an NM class locomotive and extending the 1067 mm (3'6") narrow gauge line from Stirling North to Port Augusta. Originally Port Augusta was connected to Alice Springs via Quorn from the late 1880's until the 1950's

The train control was based in Port Augusta and the workshops. After the standard gauge was opened from Port Augusta to Marree in 1956 the narrow gauge line was progressively removed.

The Council of Port Augusta and State Government of South Australia (Department of Tourism) are funding the narrow gauge line extension and NM25 reconstruction budgeted at \$ 2.5M. Transport SA has donated some track from the Cambrai Apamurra line to reduce the line extension costs.



*Locomotive NM25 pictured in the mid 1920s*

Some track laying has commenced at the Railway Station in Port Augusta and civil works which will include an underpass below the standard gauge at Stirling North, which is still used to transfer brown coal from Leigh Creek to the Augusta Power Station.

NM25 is one of two surviving Commonwealth Railways 4-8-0 locomotives used to operate the railway between Alice Springs and Port Augusta. It was manufactured by Thompson's of

Castlemaine, Victoria in 1925.

NM25 was stored at Homestead Park Port Augusta until 1990 when it was relocated to the PRRS workshops at Quorn for a strip down and survey. Funds were allocated by the Pt Augusta Council to enable dismantling and assessment of the reconstruction for an accurate estimate.

*Continued on page 7*



## Book Reviews

### John Whitton Biography

Many railway heritage enthusiasts will already have Robert Lee's 1988 book: "The Greatest Public Work" which covers the first forty years of New South Wales railways. The same author has, in "Colonial Engineer", now matched this with the biography of the dominant railway engineering personality of this period and colony.

John Whitton (1819-98) was born in the same hamlet near Wakefield, Yorkshire, as John Harrison of chronometer fame. Encouraged by a relative to take up railway construction, his talent brought him successive higher appointments. Ultimately he found himself rubbing shoulders professionally and socially with many of the engineers who were the big names of the railway age of the mid-nineteenth century, especially his eventual brother-in-law John Fowler and John Hawkshaw.

Whitton arrived in New South Wales in 1856 as Engineer-in-Chief of a small government railway that had struggled to link Sydney with Liverpool and had sections up on the Hunter that were not complete. When he retired in 1890, he left behind a network that stretched to Albury, Cooma, Hay, Bourke, Narrabri and Wallangarra, the first and last of these providing links with the differently-gauged systems of neighbouring colonies. Included in the work were two items of world renown at the time: the Great Zig Zag and the Hawkesbury Railway Bridge.

Dr Lee has written this biography in the life-and-times manner, the "times" in this case including much detail of the personalities that Whitton encountered. The value of this material is that it helps explain the many disputes and disagreements in which the subject was involved, starting with conflict with no less than the colonies' one-off governor-general who was a horse traction enthusiast. The marvel is that so much was achieved.

There are numerous old photographs in the book. Their choice successfully conveys the atmosphere of the times:



*The Town and Country Journal portrait of John Whitton, 14 September 1878*

whether they are of a misty Wolverhampton Low Level Station or an image of the primitive isolation of fettlers' accommodation in New South Wales.

The occasional engineering query does not detract from a confident, strong recommendation for ownership of this volume by heritage and history enthusiasts of all species, not just the engineering or railway varieties. — "Colonial Engineer", Pub.: Aust. Railway Historical Society, ISBN 0 86840 468 3, 352ppA4, \$49.95 hardcover (Available also from EA Books – Ed.)

Ian Bowie

### Dam Technology in Australia 1850-1999

This book outlines the technological developments that have taken place with respect to six types of dam over a period of 150 years. It does this in simple terms, which are clear and understandable to the layperson. They also are of importance to the professional because they are comprehensive and may be traced to their source via references provided. To the Reviewer's knowledge, no other book covers the full scope of information that this single publication includes. To assist the layperson, simple explanation is presented for each type of dam on how the total water pressure and the dam's own weight is transferred through the structure itself to its foundation.

Other information, on how dams came to the rescue for town water supplies, their locations, the number built in each decade, their increase in height with time and improved technology, is of great interest and importance. Inclusion also of chapters on flood estimation, spillways, and dam surveillance and safety is very appropriate.

The editor, Bruce Cole, and the authors for the different chapters including Lindsay Doherty, Frank Kinstler, Sergio Giudici, Bob Watt and Keith Murley are well known throughout the dams industry not only in Australia but outside our country as well. They, together with ANCOLD, are to be congratulated on the book's production and publication.

Mike Fitzpatrick

(Published by ANCOLD in October 2000. 260pp. Available from Asst Secretary Len McDonald.)

### The NM25 Conservation Project Continued from page 6

After extensive grit blasting and magnetic particle testing many cracks were identified in previous repairs to the frame and in the cylinder castings. Some of the failure modes are attributed to the conditions of service and foundry techniques of the time.

NM25 was relocated to the Panorama Campus of the Douglas Mawson Institute of TAFE late December 2000. Some parts including the boiler are being repaired at the SteamRanger depot to take the advantage of the local certified welders.

In April this year a new left cylinder was cast in Adelaide using hand made patterns and local expertise.

Repair procedures and inspection and test plans for the boiler repairs have been developed. A new smoke box has been cast, cab fabricated and the trailing driving wheel crank pins are currently being bored.

The frames were scrapped because they were warped and extensively cracked and will be replaced by mild steel material profile cut to the original drawings design.

NM25 is scheduled for commissioning in early 2002 and the line will be commissioned 15 th September to coincide with the EW Railway plaquing Centenary of Federation event.

For more information on this conservation project refer to the Pichi Richi web site <http://www.prr.org.au>

## Charles Gordon O'Neill, MICE 1828-1900

Professional Civil Engineer, Founder of the St Vincent de Paul Society, in New Zealand in 1876 and Co-founder in Sydney in 1881

November 10th 2000 saw the centenary of the death in Sydney of Charles Gordon O'Neill. It was celebrated by a Memorial Mass at St Mary's Cathedral, packed with members of the St Vincent de Paul Society from Australia and New Zealand.

O'Neill's life was quite extraordinary. An Irish/Scot, he was born the fourth child of seven children on 23 March 1828 in Inverary Glasgow, where his father was a spirit merchant. He studied Civil Engineering at Glasgow University and became a member of the Institution of Engineers, Scotland in 1857.

After working as a civil engineer in Scotland, in 1864 he took up the position in New Zealand of District Engineer for the Southern District and Surveyor for the Otago Principal Government. During his 16 years in New Zealand he held various engineering and surveying positions and served two terms in Parliament – as MHR for Goldfields 1866-70 and as MHR for Thames Goldfields in the North Island from 1871-75.

To help the poor and needy Maori and the Pakeha (as Maoris called the "whites"), he founded the St Vincent de Paul Society in 1876 in Wellington. In private employment, in 1878 he constructed the first steam tramway in the Southern Hemisphere and built railways, tunnels, bridges, churches, orphanages and so on.

To further his career, in 1881 O'Neill moved to Sydney, where much poverty and unemployment existed. On 24 July 1881 with the help of the Marist Fathers he established at St Patricks, Church Hill, the St Vincent de Paul Society in NSW - a much needed charitable organisation. By the time he resigned as President of the Society in Sydney in 1891, there were twenty conferences with over 300 members distributing £2000 of annual relief to the poor.

O'Neill also led a busy professional life. He and his brother John, also a Civil Engineer, formed the Sydney Harbour Tunnel Company in the 1880's, operating out of offices in the Sydney CBD. Charles was elected a member

of the Institution of Civil Engineers Westminster, London on 13 January 1880.

In 1886, with another engineer FB Gipps CE, he submitted a proposal to the NSW Government for the construction of two Sydney harbour crossings by tunnel, one from Fort Macquarie (Bennelong Point) to Milsons Point, and another from Dawes Point also to Milsons Point. This was part of the Government's search for a plan to extend the public transport system into the CBD from Redfern and across to North Sydney. The proposal was considered at enquiries and royal commissions until 1909, when it was recommended, but it was eventually abandoned in favour of the Sydney Harbour Bridge.

In 1891 Charles stood unsuccessfully for the Protectionist Party in the Sturt State Electorate (Broken Hill).

Charles and his brother John lived in Cumberland Street, The Rocks, working as professional engineers by day and outside their working hours, helping the many poor and destitute. Ill health overtook them, even though Charles was being interviewed as late as June 1897 before the Royal Commission into the Sydney Railway Extensions and Harbour Crossing.

At the time the Federation of Australia was becoming a reality, the bachelor brothers died as paupers within a few months of one another, and were interred at Rookwood Cemetery. Both were great humanitarians, helping the needy irrespective of their colour, creed, or social status.

The St. Vincent de Paul Society now flourishes in every state and territory in the Commonwealth with over 35,000 volunteer members. In 1999 in NSW and the ACT alone, 537 conferences assisted 573,666 needy people and 342,478 were interviewed or visited.



C.G. O'Neill

Vince Dever

Past President St Vincent de Paul Society, Cronulla  
Former CPEng & FIEAust

## Conferences

The following conferences will be of interest to readers, firstly our own:

- Eleventh National Conference on Engineering Heritage, "Federation, Engineering a Nation", Old Parliament House, Canberra 8th to 10<sup>th</sup> October 2001. Preconference tour commences 4<sup>th</sup> October and takes in the Snowy Mountains and heritage infrastructure in Tumut, Wagga Wagga and Junee; a second day tour visits Mount Stromlo observatory and Tidbinbilla Tracking Station.

Registration brochures are being sent concurrently with this Newsletter. Further details can be obtained from Canberra Division (Phone +61 2 6273 1315, Fax +61 2 6273 2051, Email vesna\_strika@ieaust.org.au)

- Professor Jack Cowan reminds us that a knowledge of history is, of course, a great help in determining the heritage significance of a structure and has drawn our attention to: The First International Congress of Construction History to be held in Madrid, Spain, 21-25 October 2002.

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